

REMARKS

Please cancel claims 19 – 23 without prejudice. The following remarks address the rejections of claims 1-18 and 24-31.

The Examiner maintained the rejection of claims 1-4, 6-7, 9-10, 16-17, 24, 26, and 27 as anticipated under §102(b) by U.S. Patent No. 5,390,244 to Hinman. Respectfully, the Examiner's §102 rejections fail as a matter of law. Contrary to the Examiner's assertions, Hinman does not use the energy of the speaker signal to detect ringback in a speaker signal. Applicants concisely support that contention in the below arguments. Applicants urge the Examiner to give these arguments careful consideration.

Hinman discloses a speakerphone that uses an echo-canceling filter to reduce echo caused by acoustic coupling between the speakerphone's speaker and microphone. During operation, the filter's coefficients are adapted to help ensure that the filter accurately models the actual acoustic coupling. Hinman further discloses that it may be undesirable to perform filter adaptation when the speaker signal includes periodic signal components, such as "ringback."

To prevent filter adaptation during such times, Hinman performs an autocorrelation on the speaker signal based on the premise that periodic signals exhibit relatively high autocorrelation, and aperiodic signals exhibit relatively low autocorrelation. Thus, when the speaker signal contains periodic signal components, such as ringback tones, Hinman expects the speaker signal to exhibit relatively high autocorrelation. If the autocorrelation response of the speaker signal is above a defined autocorrelation threshold, Hinman disables filter adaptation.

As a check on whether the autocorrelation-based ringback detection mechanism is working satisfactorily, Hinman assesses the echo cancellation performance of the filter by evaluating the filter's Echo Return Loss Enhancement (ERLE), which represents the filter's effectiveness at suppressing echo components from the speakerphone's microphone input signal. If the ERLE indicates that the filter is performing poorly, Hinman infers that the poor

performance is related to failing to freeze filter adaptation during ringback. Thus, Hinman uses the ERLE as an indirect mechanism to determine whether the autocorrelation threshold is set at an appropriate level, and makes threshold adjustments accordingly in the hope of improving ringback detection reliability.

Notably, Hinman's autocorrelation-based evaluation of the speaker signal for ringback detection is not dependent on that signal's energy, but rather depends directly and exclusively on the autocorrelation response exhibited by the signal. As the examiner is well aware, the autocorrelation response of a signal can be high or low irrespective of the signal's energy. Thus, it is wholly inaccurate to characterize Hinman's autocorrelation measurement as a speaker signal energy measurement.

Moreover, the autocorrelation threshold used by Hinman is not adjusted as a function of speaker signal energy, but rather is adjusted as a function of the ERLE. As just explained, the ERLE is a ratio that reflects the echo return loss of the filter and directly represents how well the filter is functioning in terms of canceling echo components from the microphone input signal. Like the autocorrelation response, ERLE is not dependent on the speaker signal's energy but rather is dependent only on the amount of echo cancellation imposed by the filter.

In direct contrast to Hinman, the present invention compares a calculated energy of the received signal to an energy threshold to determine if ringback is present. As discussed above, Hinman does not calculate the energy of the received signal. Further, Hinman does not compare the calculated energy to an energy threshold to determine if ringback is present.

Claim 1 of the present invention claims "calculating the energy of the received signal." While the auto-correlation measurement of Hinman may be a property of the received signal energy, it does not represent the received signal energy. Instead, the auto-correlation measurement simply provides a measure of the correlation of the received signal, which may be used to determine if the received signal contains periodic signal components.

Further, the auto-correlation measurement of the received signal in Hinman is not dependent on the total energy of the received signal. For example, a received signal with a high correlation may have a high total energy or a low total energy. Similarly, a received signal with a low correlation may have a high or low total energy. As such, the computed auto-correlation of Hinman cannot be interpreted as the received signal energy calculated in claim 1.

Claim 1 also claims "calculating a threshold based on said energy in said received signal." As discussed above, Hinman uses an auto-correlation threshold that varies based on the performance of the echo-canceling filter. Contrastingly, the threshold of claim 1 is an energy threshold that varies based on the received signal energy. As such, the auto-correlation threshold of Hinman cannot be interpreted as the energy threshold calculated in claim 1.

Further, claim 1 includes "determining whether ringback is present in said received signal by comparing said energy in said received signal to said threshold." As discussed above, Hinman compares an auto-correlation measurement to an auto-correlation threshold to determine if the received signal contains any periodic signal components. Contrastingly, the invention of claim 1 compares a calculated signal energy to an energy threshold to determine if the calculated energy level is indicative of ringback being present. Therefore, the comparing step of Hinman does not correspond to the comparing step of claim 1.

For at least these reasons, Hinman cannot anticipate claim 1. Further, because independent claims 16 and 24 contain limitations similar to those of claim 1, Hinman also cannot anticipate claims 16 and 24. As such, claims 1-4, 6-7, 9-10, 16-17, 24, 26, and 27 are patentably distinct from Hinman.

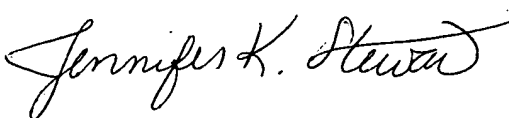
The Examiner also rejected claims 5, 14, and 18 under §103(a) as being unpatentable over Hinman in view of U.S. Patent No. 5,588,053 to Xie. However, as discussed above, Hinman does not teach or suggest each and every limitation of the independent claims from which claims 5, 14, and 18 depend. Because Xie does not correct the defects of Hinman, the combination of Hinman with Xie, assuming *arguendo* that the combination is proper, necessarily

fails to teach each and every limitation of claims 5, 14, and 18. Therefore, the §103 rejections must fail.

Because of the arguments presented above, Applicants submit that claims 1-18 and 24-31 stand in condition for allowance. Therefore, Applicants respectfully request the Examiner reconsider the rejection and permit the application to move forward in allowance. If any issues remain unresolved, Applicants request that the Examiner call the undersigned so that any such issues may be expeditiously resolved.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.



Dated: 11 May 2004

Jennifer K. Stewart
Registration No.: 53,639

P.O. Box 5
Raleigh, NC 27602
Telephone: (919) 854-1844